

In the Claims:

Please cancel claims 1-21, and add new claims 22-376 which were originally filed in the above identified parent application.

Claims 1-21 (cancelled)

22. (new) A method of maintaining temperature of an optical fiber tip in a laser system at a desired temperature, comprising the following steps:

- (a) processing specified light signals to determine a temperature for said optical fiber tip as a function thereof;
- (b) comparing said determined temperature for said optical fiber tip to said desired temperature;
- (c) generating an error signal as a function of any difference between said determined temperature and said desired temperature; and
- (d) controlling power output to a laserdiode of said laser system in accordance with said error signal.

23. (new)The method of claim 22, further comprising the step of determining whether said determined temperature is within a defined control band for said desired temperature having an upper limit and a lower limit.

24. (new)The method of claim 23, wherein a maximum power output is provided to said laserdiode when said determined temperature is less than said lower limit for said control band.

25. (new)The method of claim 23, wherein a minimum power output is provided to said laserdiode when said determined temperature is greater than said upper limit for said control band.

26. (new)The method of claim 23, wherein said power output to said laserdiode is a function

of a proportional component and an integrator component when said determined temperature is within said control band.

27. (new) The method of claim 26, said proportional component of said power output being the product of said error signal and a proportional scaling factor.

28. (new) The method of claim 26, said integrator component of said power output being the product of an integrator scaling factor and each said error signal integrated over time.

29. (new) The method of claim 28, said integrator component being preloaded upon said determined temperature transitioning into said control band so that said power output to said laser diode remains continuous during said transition.

30. (new) A system for maintaining temperature of an optical fiber tip in a laser system at a desired temperature, said laser system including a laser diode for providing a laser beam to said optical fiber tip, comprising:

- (a) a processor for determining a temperature for said optical fiber tip as a function of specified light signals detected in said laser system;

- (b) a power amplifier for supplying power to said laser diode; and

- (c) a controller for providing a power output signal to said power amplifier, said controller containing an algorithm for calculating said power output signal which is a function of an error signal generated by a comparison of said determined temperature and said desired temperature.

31. (new) The system of claim 30, wherein said controller provides a power output signal so that a maximum power is supplied to said laser diode by said power amplifier when said determined temperature is less than a lower limit of a defined control band for said desired temperature.

32. (new) The system of claim 30, wherein said controller provides a power output signal so that a minimum power is supplied to said laser diode by said power amplifier when said determined temperature is greater than an upper limit of a defined control band for said desired temperature.

33. (new) The system of claim 30, wherein said algorithm is a function of a proportional component and an integrator component when said determined temperature is within a defined control band for said desired temperature.

34. (new) The system of claim 33, said proportional component of said algorithm being a product of said error signal and a proportional scaling factor.

35. (new) The system of claim 33, said integrator component of said algorithm being a product of an integrator scaling factor and each said error signal integrated over time.

36. (new) The system of claim 35, said integrator component being preloaded upon said determined temperature transitioning into said control band so that power supplied to said laser diode remains continuous during said transition.